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EcoServe (Ireland)

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Roisin Nash had just finished reading a new report that had recently been launched by the Minister for Communications, Marine and Natural Resources Noel Dempsey at the headquarters of the Marine Institute at Oranmore in County Galway. The report, entitled 'Sea Change – A Marine Knowledge, Research and Innovation Strategy for Ireland 2007- 2013', presented a national agenda (comprising of science, research, innovation, and management) aimed at a complete transformation of the Irish maritime economy. Roisin felt that the report provided a clear and realistic picture of future opportunities and challenges within the Irish marine industry, and that it would serve as a roadmap for selective and managed investment in marine research and innovation over the next seven years. The report also incorporated applied and basic research programmes, which aimed to increase industry competitiveness, build new research capacity, and address policy issues. According to the press release to the report, the investment required to support the implementation of the strategy was significant, but it would enable the sector to build upon the major advances made in marine research in the period of the current development plan, help remedy the neglect of Ireland's marine resource over past decades, and enable the sector to contribute to economic and social development goals.

But the industry had seen such reports before and was sceptical that it would be followed through effectively. A previous report by the Marine Institute in 2000 ('A Framework for an Action Plan on Marine Biodiversity in Ireland'; see Appendix 1), had identified a whole series of actions that needed to be taken if Ireland was to significantly improve its commitments in the area of marine biodiversity. The report had recognised that marine biodiversity was of both direct and indirect importance to mankind by providing food in the form of fisheries and aquaculture, and a recreational environment for tourism. Additionally, many species of marine life which are not directly harvested for food, are themselves food for fish and shellfish and thus key elements in the marine food chain. What interested Roisin most about both of these reports was that it demonstrated to her the wonderful opportunities

[1] This case was prepared by Dr Thomas M. Cooney as the basis for class discussion rather than to illustrate either the effective or ineffective handling of a business situation. The case was first published in the report "The Working Partnership: SMEs and Biodiversity" which was written by B. Dickson, D. Watkins, J. Foxall (2007) and published by Fauna & Flora International, Cambridge, UK. The case was written as part of the EU funded Probioprise project which was undertaken by Fauna & Flora International, EFMD and the European Bureau for Conservation and Development.

that were available to her company which specialised in the area of marine biodiversity. Having taken over as Managing Director of EcoServe just the previous month, she was eager to get a deeper understanding of the opportunities and challenges that awaited the business. However, Rosin felt that she initially needed to establish the current position of the business and thereafter examine the possibilities that might exist for its future growth.

Background to EcoServe

It is estimated that approximately 60% of the global population lives within roughly 100 kilometers of the shore. This means that about 3.4 billion people rely heavily on marine habitats and resources for food, building materials, building sites, and agricultural and recreational areas, and use coastal areas as a dumping ground for sewage, garbage, and toxic wastes. Moreover, much of the remaining non-coastal population is concentrated along rivers and other waterways. Pollution and poor land use practices within these watersheds affect downstream marine habitats because sediments and pollutants are ultimately washed into coastal waters.

There are now manifold pressures on the world's marine ecosystems. These pressures include coastal population density and continued population growth (which are accompanied by increased consumer demand for marine products), increased waste disposal, rapid alteration of coastal habitats, uncontrolled industrial pollution, inadequate institutional structures for managing marine resources, lack of property rights and management regimes within international waters, and a lack of understanding and awareness of marine ecosystem processes and the effects of human actions on marine biodiversity. Much of the world's marine ecosystems - particularly near-shore habitats - are stressed by a combination of these factors. As an example of the impact of the damage caused by human actions on marine biodiversity, the Black Sea is dying under the weight of pollution and overfishing. Land-based pollution in the form of industrial wastes, sewage, and runoff of pesticides and fertilizers, combined with oil and other wastes from ship traffic, have contaminated the entire basin. Eutrophication has left 90% of the Black Sea facing critically low oxygen levels. The total fish catch within the region declined by 64% between 1986 and 1992. The cost of this damage is estimated at $500 million annually to the fishing and tourism industries alone.

It was within this background context that Ecological Consultancy Services Ltd (EcoServe) was established. The business was created so as to provide aquatic consultancy and research services to industry, local authorities, and government agencies at national and international levels, with particular reference to the issues surrounding biodiversity. The company was registered in 1996 by Mark Costello, an academic in Trinity College Dublin, together with his PhD student Chris Emblow. The business began operating in 1997 and was based around a group of researchers who were working on the BioMar Project, a proposal that was established to make an assessment of the marine biodiversity of Ireland for the selection of marine Special Areas of Interest (SACs). The key tasks of the project were: (1) the assessment of sites of conservation importance; (2) the determination of areas sensitive to disturbance and pollution; (3) the preparation of environmental impact assessments; and (4) the monitoring of environmental change.

In the early days the business operated from the Enterprise Centre in the Dublin suburb of Terenure, where the cost of rent was low and they had a free reception service. While Mark and Chris were the two founders, the company additionally had two employees who were former research assistants at Trinity College. In establishing the business as a private limited company, no initial capital injection was invested by the founders and the company has never required a loan or overdraft facility. When asked many years later why he set up the company, Mark responded by stating that ‘I wanted to give careers to the research staff. New employment legislation meant that it was impossible for the university to rehire staff after 3 years as they would have to be made permanent, and the university were not prepared to make such offers”. The Environmental Services Unit in which Mark was based was also being disbanded and there would be no permanent academic post for him, although the university was prepared to offer him a short-term contract which he did not want to take.

The business began with two EU Projects that Mark had won but not yet started. Since then, EcoServe has amassed substantial experience in the assessment of natural and developed aquatic environments, focusing on their protection, enhancement, and remediation. EcoServe specialises in marine, estuarine, and freshwater ecology, and can facilitate related terrestrial ecological work through associate consultants. It provides technical environmental services, including impact and nature conservation assessment, ecotoxicology, monitoring and authoritative analysis, and the interpretation and management of computerised data, with a specialisation in marine and freshwater systems. A sizeable proportion of EcoServe’s work

involves Environmental Impact Assessments (EIAs) around the coast of Ireland which is undertaken for a wide variety of activities such as marina and harbour development; bridges, roads and housing developments; offshore wind farms; aquaculture; aggregate extraction; oil and gas exploration; sewage treatments; and power stations. However, EcoServe's customers are primarily generated by government policy and regulation, particularly through the requirement that developers carry out EIAs prior to planning permission being granted. Therefore without this regulatory framework, EcoServe would lose many of its customers and struggle to be economically sustainable, since the state is either a customer or creator of customers for EcoServe and its competitors.

Over the past 10 years, in excess of 200 projects from across all of its service activities have been successfully completed by EcoServe. During that time, the company has also seen a number of personnel changes with 10 people joining and later leaving the company. In 2000, Chris took over as Managing Director, and in 2002 Mark moved to Canada (and more recently to New Zealand), although he continues to contribute to the work of the business. In 2005, Chris moved to Norway and for a period managed the business remotely. However, it was getting ever more challenging to keep staff due to the distance of the Managing Director and also due to the poor wages in the industry caused by low daily consultancy rates. In February 2006, Dr Roisin Nash joined the company from the National University of Ireland in Galway where she had been a Project Manager in the area of marine research. Roisin immediately took responsibility for a number of the projects that were being undertaken by EcoServe and brought them to fruition. Chris's involvement in the business from Norway was becoming increasingly difficult to maintain on a regular basis and so he decided to step down from the post of Managing Director, although he continues to play a role in the business. In late 2006, Roisin was asked by the founders to take the position of Managing Director with a view to eventually examining the possibility of buying out the business. Her new job started in January 2007.

Services Offered by the Company

The knowledge that Roisin Nash had accumulated over the years regarding marine biodiversity had left her feeling confident about her expertise in this arena. However, what she was less confident about was her ability to manage a small enterprise. While she had project management experience, she had no experience or training in running a business, and

because she was still relatively new to the company, she was not even familiar with their financial accounts or the future prospects of the business. She felt that the first step that she needed to take was to review the company's current activities and to undertake a SWOT analysis.

From her work with the company over the previous 10 months, Roisin had established that EcoServe offered three broad areas of services: marine consultancy, freshwater consultancy, and research. The company routinely conducted both field and desktop ecological investigations for various industry sectors. These projects had included environmental impact assessments, remediation investigations, analytical reports, regulatory compliance assessment, infrastructure assessment and design, expert testimony, field collection, laboratory analysis, and data interpretation. EcoServe had successfully completed elements of many environmental assessment and impact projects, including design of field investigations, sampling and laboratory analysis, data analyses, ecological assessment, preparation of impact statements, expert testimony at oral planning appeals, and negotiations with regulatory agencies. The company had also developed an electronic database on marine ecological literature around Ireland, and a bibliographic database on aquaculture / environment interactions. With extensive equipment and staff resources, EcoServe was able to conduct intensive biological and physical / chemical investigations of fresh, estuarine, and marine water bodies.

The company additionally regularly developed and managed research projects, both in Ireland and at a European level. EcoServe had developed substantial expertise in the field of environmental communications through the management of websites and listservers (including the European Marine Research Information Network in Biodiversity), and the production and editing of newsletters for four EU projects and several other projects, both national and international. EcoServe acted as principal co-ordinator for two EU projects, including the European Register of Marine Species, which developed a standard European list of marine fauna and flora. EcoServe led sections of several other projects on marine biodiversity and fisheries interactions, and implementing and networking large-scale, long-term marine biodiversity research in Europe. EcoServe acted as the Irish national node for the BioCASE programme, which developed an online access service to European biological collections. The company also acted as the Irish national focal point for the Fauna European project which created a standardised faunal list for Europe. Furthermore, EcoServe hosted

various workshops and conferences (both conventional and electronic) on both a national and European scale.

Another capability possessed by EcoServe was the equipment and expertise to conduct offshore surveys, including dredge and grab sampling for benthos species, trawl sampling for fish species, phytoplankton sampling, dive surveys, and underwater video surveys (in association with partner organisations). EcoServe offered a specialised assessment of the impact of many types of developments on marine and estuarine ecosystems, and offered recommendations to clients on methods to minimise and mitigate against negative impacts. Recommendations could also include advice relating to the timing and location of developments and the best available techniques to minimise impacts.

Combining research and consultancy had enabled EcoServe to stay on top of the current thinking and priorities in marine research, and to build on their extensive network of associated researchers and partners. This expertise was passed directly to their clients, enabling EcoServe to provide an efficient and scientifically guided service backed up by realistic expertise. Their service encompassed the biology of freshwater animals, plants, and micro-organisms at the level of individuals, populations, or communities in relation to their natural environment. They additionally covered taxonomy and biodiversity studies of freshwater organisms and environments. EcoServe advised clients on and provided the most appropriate sampling and survey techniques for a range of freshwater flora and fauna. EcoServe provided a coordination of fisheries biology and habitat expertise necessary to conduct biological assessments of aquatic species and their habitat. In addition, EcoServe coordinated various development options for their clients when confronted with protected habitat and endangered species. Solutions included mitigation of project impacts through aquatic habitat restoration activities and appropriate construction practices.

Highlighting EcoServe's Work

While there is tremendous variety to EcoServe's activities in terms of the type of work that it undertakes, there is also a mix between national and international work. A recent example of the contrast in its work has been the Pearl Mussel survey that it has been undertaking on the River Nore, the Dublin Eastern By-Pass Project, the MarBEF project, and the MARBENA Project. The work on the River Nore is a regular survey that it carries out for a local

authority. The work can only be undertaken by someone who has a license to handle pearl mussels as they are a protected species, with the license awarded on a yearly basis. One of the interesting elements to this work is that the strong presence of pearl mussels is an indicator of good quality water.

The Dublin Eastern Motorway Bypass Project is a study of how marine and estuarine ecology which be impacted upon by the various options being considered for the Eastern Bypass. The areas that potentially could be affected by the work include the extensive sandflats of Sandymount Strand, the Liffey Estuary, and the Tolka Estuary. Sandymount Strand is designated a candidate Special Area of Conservation (cSAC)(Site Code 000210) owing to its extensive areas of sand- and mudflats, which are habitats listed on Annex I of the EU Habitats Directive (92/43/EEC), which was transposed into Irish law by the European Union (Natural Habitats) Regulations, 1997 (S.I. 94/1997). The area is also an internationally important bird site with two species listed on Annex I of the EU Birds Directive (79/409/EEC) and is designated a Special Protection Area (SPA) (Site code 024) under the Directive. In addition, there are beds of the dwarf eelgrass (Zostera noltii) which are the largest on the east coast. The River Liffey supports populations of Atlantic salmon (Salmo salar) and trout (Salmo trutta). The Liffey Estuary has been highly modified by the construction of the river walls and the port facilities, and there have been historical problems with pollution, especially organic pollution. The River Tolka flows into Dublin Port to the north of the Liffey. The Tolka Estuary is a mudflat and forms part of the North Dublin Bay cSAC (Site code 000206) and combines with Sandymount Strand to form the Sandymount Strand/Tolka Estuary SPA (Site Code 024). The shoreline has been altered by flood defence measures and land reclamation works. To establish the impact of the various options being considered for the Eastern Bypass on the marine and estuarine environment, and assist in deciding upon the preferred option, it is necessary to make an assessment of the existing fauna, flora, and habitats of the littoral and sublittoral environments (where appropriate) within the study area. Owing to the designation of the majority of the study area as a conservation site, a comprehensive field survey is required.

MarBEF is a network of excellence funded by the European Union and consisting of 91 European marine organisations. It is a platform to integrate and disseminate knowledge and expertise on marine biodiversity, with links to researchers, industry, stakeholders, and the general public. MarBEF is funded within the sustainable development, global change, and

ecosystems RTD Programme of the EU's Sixth Framework Programme. The specific integration effort of MarBEF is focused upon the following major activities:

1. Creating a virtual centre for durable integration,
2. Creating and improving access to resources,
3. Providing specialist training,
4. Developing an integrated data and information management system,
5. The transformation of MarBEF's long-term, strategic approach into policy.

One of the key activities of MarBEF is the development of a national database of SMEs, end users, policy makers, and others who are active in this area. The database is currently being developed through a detailed questionnaire of people from the different countries involved in the project. It will be openly accessible when completed and should be a tremendous resource for people working in marine biodiversity. EcoServe is a member of the MarBEF network and Róisín is its Outreach and Communications Officer.

The MARBENA Project is about creating a long-term infrastructure for **MAR**ine **B**iodiversity research in the **E**uropean economic area and the **N**ewly **A**ssociated states. The primary objectives of the MARBENA project are to: (1) create an infrastructure for marine biodiversity research in Europe by creating a pan-European network of marine scientists, improving the science by cataloging the existing expertise and infrastructure, and providing an intellectually attractive environment for young scientists and a discussion forum for all; (2) create awareness on the issues at stake and enlarge the visibility of marine biodiversity research in Europe by communicating with EU policy makers and politicians, liaising with global organisations and programmes, and disseminating information to the public at large. In this project special effort has been undertaken to include the scientists (and through them the other stakeholders of marine biodiversity research) from the Newly Associated States within the network. To support this concept, well-known and respected scientists who are residents of the NAS were selected as ‘MARBENA Ambassadors’, and these individuals actively extend the network in their own countries. EcoServe is also a member of this network and MarBEF is one of the principal stakeholders in the project.

Analysis of Current Activities

As part of EcoServe’s commitment to providing a good quality service, all of its staff are qualified ecologists and biologists who are experienced at applying life and physical sciences

to environmental and engineering problems. The environmental assessments and impact analyses carried out by EcoServe staff streamlines the environmental review and planning process which enables projects to advance through this stage as quickly and as economically as possible. However, the company has been relatively short-staffed in recent times as Chris was only contributing two days per week, Mark was effectively a silent partner, one part-time person who took care of administration and accounts, which left just one full-time consultant in addition to Roisin. Since then, an additional full-time person has been employed by the company. While it was a positive that EcoServe were able to provide such a wide range of services, Roisin wondered if they should be more focused in what they were offering. To help her understand the current position of the company, Rosin did a quick SWOT analysis of the business (see Table 1).

Table 1 – SWOT Analysis

Strengths	**Weaknesses**
Good reputation – high quality work	Lack of marketing
Specialist in marine and freshwater market	Undifferentiated products and services
People involved have extensive industry experience	Poor location in terms of work (more on the west coast)
Strong participation in EU projects	Turnover of staff is high
Good location of business in terms of airport	Poor financial performance
Good network of contacts	No Business Plan
Opportunities	**Threats**
Environmental legislation is becoming more prevalent	Strong competition from sole traders who operate less
Diversification into other areas of activity	Non-enforcement / loosening of EU regulations
Develop existing activities further (e.g. GIS, databases)	Possible slow down in the building trade
Grow the company through alliances with partners	
Avail of E.U. Framework 7 research funding	
Expansion of business by growing staff numbers	
General awareness of biodiversity issues is getting stronger	

One of greatest strengths traditionally within the company was its networking ability. Over the years, Mark and Chris had built-up a very strong network of contacts, both nationally and internationally, through their work with clients in Ireland and EU Research Projects abroad. This networking capacity had enabled EcoServe to build a very strong brand within the industry, but the company's networking capacity was now seriously threatened by the significantly less active roles being taken by the founders of the business. This was a serious cause of concern for Roisin.

Another area of concern that Roisin had identified was in the customer and market analysis. She had established that 90% of EIA (Environmental Impact Assessment) studies was from private developers, that freshwater jobs had a quicker turnover but lower margins, and that EU Projects were big budgets but of no direct profit (people employed on an EU Project could be used on another project to help make some money). However, she was unable to establish the percentage of the company's business activities that could be attributed to marine consultancy, freshwater consultancy, and research activities. Neither could she determine what the average profit margins were for each area of activity.

The area of the business that gave Roisin greatest cause for alarm was the financial performance. Having reviewed the financial accounts with the company's accountant, she had highlighted a number of concerns. The turnover for the business was approximately €360,000 in 2006 (year ended 31st August) which was down a disturbing €120,000 from the previous year. Profit was down to €48,000 from €180,000, although this was better than the results for 2004 (loss of €59,000) and 2003 (loss of €53,000). Roisin also noted that the total expenses for the year just finished were almost the same as for 2005, despite the fact that there had been a 25% reduction in turnover. She was also concerned that the net profit before taxation was just 13.33%, down from 37.5% the previous year. She had already decided that she would need to focus much of her attention in this area. What she had not decided was whether she should concentrate her energies on increasing sales, increasing margins, or decreasing costs.

But the SWOT analysis had thrown up a number of other areas of critical concern also. For example, it had become apparent that there was no defined marketing strategy for the company, nor was there a Business Plan. The approach to getting customers was typically haphazard and lacked any sense of purpose or focus. The office was left to run on its own without being visibly managed. There were no clearly defined goals for the business, nor a timeframe for action. Many of these difficulties would naturally have emanated from the business being remotely managed but Roisin was currently working so hard completing client projects that she had no time develop a Business Plan. Roisin's review of the business also highlighted that the business was busier during the summer months and that she might need to hire three additional people during the busy period. These three people would also need to be trained on GIS (Geographic Information Systems) as that was where the company could

make some good money quickly. However, last year's financial results left the possibility of being able to afford these people still open to question.

Profile of the Marketplace

The market in which EcoServe operates is very difficult to assess. A review by Roisin of the environmental consultants listed by Enterprise Ireland highlighted that there were 84 companies who offered environmental consultancy services. Only some of these specialised in the marine and freshwater sector, but most offered to undertake EIA (Environmental Impact Assessment) studies for whatever client wanted such work done. The market was highly competitive and price sensitive since a large proportion of the consultancy companies were sole traders. The increasing levels of environmental legislation being introduced through EU and Irish law meant that this market was becoming an ever more enticing target for lone operators. The barriers to entry to the market place were low, and anyone with a related qualification could set-up a business from their home.

Roisin's review of the competitors highlighted a number of key players within the niche market that EcoServe operated. These companies included:

- Aqua-Fact (Galway) - the company employs 12 full-time, 2-6 part time, and a range of consultants covering a wide range of disciplines. Aqua-Fact was the first Irish environmental consultancy to be awarded ISO 9002 accreditation.
- EnviroCentre (Belfast) – the company is a multi disciplinary team of environmental consultants providing Development, Sustainability and Catchment Management services to a wide range of public and private sector organisations across the UK and Ireland.
- TechWorks Marine (Dublin) - TechWorks Marine Limited was founded in 2001, in response to a demand for integrated environmental monitoring platforms for the marine industry. The founders of TechWorks Marine Charlotte O'Kelly and Philip Trickett brought together their expertise in the design and development of data acquisition systems, integrated operational platforms, project management, and worldwide contacts in marine technology.

Roisin determined that if the business was to develop then she would need to get a better profile of the market and of the competitors within it, as she was currently working only from anecdotal information provided to her by Mark and Chris.

While the company had broadly divided its competitors into private organisations, government agencies, and European bodies, it was very difficult for Roisin to further segment the market since a wide range of industries were represented on the company's client list. She needed to consider some way of categorising the clients and then undertaking a financial analysis of each category to establish which ones were most profitable and needed to be prioritised. To do this, she first needed to build a database of the company's clients since such information did not currently exist. Roisin was convinced that there was much more money to be made in Ireland, despite the influx of competition from sole traders, but that if EcoServe was to become highly profitable then the company would have to differentiate itself within the crowded marketplace. Indeed, a priority for the company was to build a number of consistent revenue streams from strategically targeted niches that earned good profit.

Future Direction

As Roisin sat back in her chair, she began to realise the enormity of the challenge that lay ahead. The report she had read highlighted the importance of the marine industry to Ireland but she felt that it was the 2000 report 'A Framework for an Action Plan on Marine Biodiversity in Ireland' that offered her greater clues as to where the company should position itself. Once the positioning strategy had been decided, the company then needed to develop and implement a new marketing plan to make it happen. She also needed to address the financial challenges that faced the business while juggling limited personnel resources. The company was committed to a number of European Projects that were excellent in terms of profile but limited in terms of profitability. She wanted to reduce staff turnover and she believed that this was best achieved by helping their personal development through training, increasing their salaries, and building a strong team spirit. However, she was less certain how this could be achieved within the financial constraints that she faced. She felt that there were potential opportunities in education and outreach projects but wondered if she was now beginning to lose focus. She also recognised that she needed a plan but that she had no time to write it, and questioned whether she should she bring in a consultant. Roisin admired Mark and Chris for what they had achieved in the business and how their energy and network of contacts had built the business to where it currently resided. She now began to wonder if she

was capable of meeting the challenges that awaited her? Those who knew Roisin well were very confident that she would succeed.

Appendix 1 – 'A Framework for an Action Plan on Marine Biodiversity in Ireland'

Recommendations published in November 2000 by the Marine Institute

National Marine Biodiversity Resources Database

- Establish a regularly updated electronic
    - inventory of marine species in Ireland
    - bibliography of publications related to marine biodiversity in Ireland
    - database of the distribution, nomenclature, commercial and conservation status of marine species.
- These facilities should be interconnected, via the World Wide Web, and have a system for their long-term maintenance.
- Develop a plan for the establishment and long-term maintenance of a national marine resources database that uses the best available scientific expertise and builds on existing data.
- Production of readily available electronic datasets (e.g. atlases, species databases, inventories, etc.) of Ireland's marine and coastal environment and its biodiversity which will act as a form of 'gap analysis' and basis for additional layers of information.

Management

- Develop detailed Action Plans for management of biodiversity for each marine sector, including aquaculture, fisheries, tourism, hydrocarbon exploration and extraction, and transport.
- Establishment of a Working Group for marine biodiversity research to develop this report, advise on priorities and form a contribution to a national biodiversity committee.
- Inclusion of marine biodiversity in the national ICZM strategy and Research and Development programmes.
- Development of management strategies (e.g. codes of practice) for different sectors to conserve marine biodiversity.
- Involve public and private partnerships in marine biodiversity conservation.
- Provide national infrastructure to expand Irish biodiversity research in offshore and deep-sea environments.
- Establish more marine areas where human activity is controlled so as to protect marine biodiversity.

Environmental Impact Assessment

- To require assessment of impacts on biodiversity in marine developments, including aquaculture, new harvesting of natural resources (e.g. fisheries, gravel, sand, seaweed, oil, gas, coal, windfarms), dredging and spoil disposal, and construction works.
- To establish a publicly available archive for environmental reports conducted for offshore exploration and foreshore licences.

Marine Bioprospecting

- A national policy for the management of marine bioprospecting should be developed. This should encourage research and address the export of, and possible patents arising from, biological samples collected in Irish waters.
- Representative fully labelled samples of all biological materials collected in Irish waters by foreign research vessels should be lodged in a national archive, such as the National Museum.

Taxonomy

- Develop a quality control system for marine research and management that is based on best practice in taxonomy.
- Establish funding for training in identification skills, research in taxonomy, and methods for measuring marine biodiversity that will aid management.
- Develop the National Museum for archiving specimens and research in taxonomy related to marine biodiversity.

International Activities

- Consider Ireland's responsibility as a developed country, and the benefits to the national skill pool and economy, of developing overseas marine research that would contribute to global as well as local issues.
- Marine biodiversity management should co-operate with neighbouring countries.
- Monitoring
- Review of current marine monitoring activity in the public and private sectors, and instigation of a long-term programme to provide an integrated system for monitoring marine biodiversity and its environment.
- Identify how existing environmental monitoring datasets can be better used.
- Development of a system for the rapid and permanent availability of monitoring data for research and management.
- Implement measures to monitor and control the introduction and dispersal of exotic (alien) species.

Research

- Support research to underpin management decisions, such as:
    - How marine biodiversity is generated and maintained,
    - Role of oceanographic factors in the dispersal of populations,
    - Potential of seascapes as units for managing marine areas.
- Identify:
    - suite of techniques for monitoring and assessing marine biodiversity at genetic, species, biotope and ecosystem levels;
    - areas of significant marine biodiversity;
    - distribution of rare and endemic species;
    - biodiversity (species, genomes) of social, cultural, economic, and ecological importance;

- relationships between populations of species of commercial, ecological (e.g. indicator), and nature conservation importance so as to best design marine conservation areas and control harvesting strategies;
- how connected or isolated are populations of important species around Ireland (e.g. are some areas sources of widely distributed stocks?)
- the bio-prospecting potential of marine biodiversity in Irish seas;
- the value, in social, cultural and economic terms, of marine biodiversity in Ireland;
- the rates of recovery of marine biotopes from human impacts (e.g. under fish cages, trawling, dredging);
- the economic and ecological benefits of Marine Protected Areas for fisheries and other resources.

Education, Fellowships and Training

- Establish a national system to support research by individual scientists in marine biodiversity. This should include post-doctoral fellowships, PhD studentships, and special awards for senior researchers in Ireland or overseas to take leave of absence (or sabbaticals) so as to conduct research on Ireland's marine biodiversity. The possible need for training workshops in aspects of marine biodiversity should be noted.
- Review of educational resource needs at primary, secondary, tertiary and public levels in relation to marine biodiversity.